# Notice No.1

## Rules and Regulations for the Classification of Offshore Units July 2016

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that paragraphs, Tables and Figures are not shown in their entirety. This Corrigenda Notice shows amendments only.

## Issue date: November 2016

| Amendments to | Effective date |
|---|---|
| Part 1, Chapter 2, Sections 1, 2 & 3 | Corrigenda |
| Part 1, Chapter 3, Sections 2 & 4 | Corrigenda |
| Part 3, Chapter 15, Section 1 | Corrigenda |
| Part 4, Chapter 3, Section 3 | Corrigendum |
| Part 4, Chapter 4, Section 1 | Corrigendum |
| Part 4, Chapter 6, Sections 1, 3, 4 & 7 | Corrigenda |
| Part 5, Chapter 1, Section 2 | Corrigenda |
| Part 6, Chapter 1, Section 2 | Corrigenda |
| Part 7, Chapter 1, Sections 1 & 6 | Corrigenda |
| Part 7, Chapter 3, Section 3 | Corrigenda |
| Part 9, Chapter 1, Section 1 | Corrigendum |
| Part 10, Chapter 1, Sections 1, 4 & 10 | Corrigenda |
| Part 10, Chapter 2, Section 3 | Corrigenda |
| Part 10, Chapter 3, Sections 1, 2 & 6 | Corrigenda |

# Part 1, Chapter 2
# Classification Regulations

## ■ *Section 1*
## Conditions for classification

### 1.4 General

1.4.1 Offshore units built in accordance with LR's Rules and Regulations, or in accordance with requirements equivalent thereto, will be assigned a class on ~~the~~*Class* the *Class Direct* website and will continue to be classed so long as they are found, upon examination at the prescribed surveys, to be maintained in accordance with the requirements of the Rules. Classification will be conditional upon compliance with LR's requirements for materials, structure, machinery, equipment and other safety considerations.

## ■ *Section 2*
## Definitions, character of classification and class notations

### 2.1 General definitions

2.1.24 **Surface type units** are units with a ship or barge-type displacement hull of single or multiple hull construction intended for operation in the floating condition.

### 2.4 Class notations (hull/structure)

2.4.4 **Special features notation**. A notation indicating that the unit incorporates special features which significantly affect the design, e.g.~~,~~ **DRILL** ~~or~~**PPF** or **PPF**. ~~See~~ *See Pt 1, Ch 2, 2.4 Class notations (hull/structure) 2.4.13*.

2.4.13 The following special features class notations may be assigned as considered appropriate by the Classification Committee:

**OIWS** This notation for In-Water Survey may be assigned to a unit where the applicable requirements of LR's Rules and Regulations are complied with, ~~see*Pt 1, Ch 3, 4.3 In-water surveys,Pt 3, Ch 1, 2.1 General*~~ *see Pt 1, Ch 3, 4.3 In-water surveys, Pt 3, Ch 1, 2.1 General* and *Pt 8, Ch 1, 1.3 External zone protection*.

### 2.8 Class notation (Verification Schemes)

2.8.1 When an Owner requests classification based on a Formal Safety Assessment, ~~see 1.2.3~~ *see Pt 1, Ch 2, 1.1 Application 1.1.8* and verification is carried out by LR in accordance with the Regulations of a National Administration and the Guidelines in *Pt 1, Ch 5 Guidelines for Classification using Risk Assessment Techniques to Determine Performance Standards*, the class notation **CAV** may also be assigned to classed installations as considered appropriate by the Classification Committee. The notation will be maintained subject to periodical surveys during operation as detailed in *Pt 1, Ch 5 Guidelines for Classification using Risk Assessment Techniques to Determine Performance Standards*.

### 2.9 Descriptive Notes/Supplementary Character

2.9.1 In addition to any class notations, appropriate descriptive qualification notes may be entered on the Class Direct website indicating the type of unit in greater detail than is contained in the class notation, and/or providing additional information about the design and construction, e.g.~~,~~ semi-submersible. A descriptive qualification is not a LR classification notation and is provided solely for information. Examples of descriptive notes are:

## ■ *Section 3*
## Surveys – General

### 3.5 Existing installations – Periodical Surveys

3.5.3 The Owner should notify LR whenever a unit can be examined in dry dock or on a slipway. A minimum of two Docking Surveys are to be held in each five-year Special Survey period and the maximum interval between successive Docking Surveys is not to exceed three years. The Classification Committee will accept In-Water Surveys in lieu of Docking Surveys on units assigned an **OIWS** (In-Water Survey) notation, ~~see*Pt 1, Ch 3, 4.3 In-water surveys*~~ *see Pt 1, Ch 3, 4.3 In-water surveys*.

# Part 1, Chapter 3
# Periodical Survey Regulations

## ■ *Section 2*
## Annual Surveys – Hull and machinery requirements

### 2.1 General

2.1.4 For salt-water ballast tanks, other than independent double bottom tanks, where a protective coating is found to be in POOR condition, as defined ~~in*Pt 1, Ch 3, 1.5 Definitions*~~ in *Pt 1, Ch 3, 1.5 Definitions*, and it has not been repaired, where a soft or semi-hard coating has been applied or where a protective coating was not applied from the time of construction, maintenance of class will be subject to the spaces in question being internally examined and gauged as necessary at Annual Surveys.

### 2.7 Drilling units

2.7.3 Safety and communication systems and hazardous areas are to be examined in accordance ~~with*Pt 1, Ch 3, 2.4 Safety and communication systems and hazardous areas*~~ with *Pt 1, Ch 3, 2.4 Safety and communication systems and hazardous areas*.

## ■ *Section 4*
## Docking Surveys and In-water Surveys – Hull and machinery requirements

### 4.3 In-water surveys

4.3.13 For electrical equipment survey requirements of units five years old and over, ~~see*Pt 1, Ch 3, 9.2 Complete Surveys*~~ *see Pt 1, Ch 3, 9.2 Complete Surveys*.

# Part 3, Chapter 15
# Integrated Software Intensive Systems

## ■ *Section 1*
## Integrated Software Intensive System – 'ISIS' notation

### 1.1 General

1.1.1 Integrated Software Intensive System class notation **ISIS** may be assigned where an integrated computer system in compliance with *Pt 6, Ch 1, 6 Integrated computer control - ICC notation* of the *Rules and Regulations for the Classification of Ships, July 2016* provides fault tolerant control and monitoring functions for systems that are critical to safety or operational performance. Identification of the Integrated and Software Intensive Systems are to be derived using a risk assessment technique to a recognised National or International Standard, such as those detailed in IEC~~/~~ ISO 31010 Risk Management – Risk Assessment techniques. Examples of such systems are listed but not limited to the following~~:~~ :

- Communication Systems.

# Part 4, Chapter 3
# Structural Design

## ■ *Section 3*
## Structural idealisation

### 3.2 Geometric properties of section

3.2.1 The symbols used in this sub-Section are defined as follows:

$f$ = ~~$0{,}3\left(\frac{l}{b}\right)2/3$~~ $0{,}3\left(\frac{l}{b}\right)^{2/3}$ but is not to exceed 1,0. Values of this factor are given in *Pt 4, Ch 3, 3.2 Geometric properties of section 3.2.1*

# Part 4, Chapter 4
# Structural Unit Types

## ■ *Section 1*
## Column-stabilised units

### 1.1 General

1.1.3 Production and oil storage units are to comply with the requirements ~~of*Pt 3, Ch 3 Production and Storage Units*~~ of *Pt 3, Ch 3 Production and Storage Units*. Columns and pontoons designed for the storage of oil in bulk storage tanks are to be of double hull construction. If pontoon oil storage tanks are always kept empty in transit conditions, a double bottom need not be fitted, except where a double bottom is required by a National Administration and/or Coastal State Authority.

# Part 4, Chapter 6
# Local Strength

## ■ *Section 1*
## General requirements

### 1.1 General

1.1.6 The connections to anchor points as defined in *Pt 3, Ch 10, 10 Fairleads and cable stoppers* and the structure in way of fairleads, stoppers, winches, etc. (~~see*Pt 3, Ch 10, 10 Fairleads and cable stoppers*~~ *see Pt 3, Ch 10, 10 Fairleads and cable stoppers and Pt 3, Ch 10, 11 Anchor winches and windlasses*) forming part of anchoring or positional mooring systems are to be designed for a working load equal to the breaking strength of the mooring or anchoring lines main component it connects to. Permissible stresses are to be in accordance with *Table 5.2.1 Factors of safety for the combined load cases* – load case (d) in *Pt 4, Ch 5, 2 Permissible stresses*. Special consideration will be given to grouped line redundant positional mooring systems.

1.1.13 The supporting structures to production and process plant are to comply ~~with*Pt 3, Ch 8 Process Plant Facility*~~ with *Pt 3, Ch 8 Process Plant Facility*.

## ■ *Section 3*
## Watertight shell boundaries

### 3.4 Buoys and deep draught caissons

**Table 6.3.4 Shell framing self-elevating units**

| Items and location | Modulus |
|---|---|
| (2) Primary members, *see* Note 1<br>(a) Bottom web frames supporting framing<br>(b) Side web frames supporting framing | <br>$Z = 6{,}4k\,h_T\,S\,l_e^2$ ~~x $10^{-3}$~~ $cm^3$<br>$Z = 6{,}4k\,h_T\,S\,l_e^2$ ~~x $10^{-3}$~~ $cm^3$ |

## ■ *Section 4*
## Decks

### 4.4 Deck supporting structure

**Table 6.4.3 Deck girders, transversers and deep beams**

| Location and arrangements | Modulus, in $cm^3$ |
|---|---|
| (1) Girders and transverses in way of dry spaces:<br>(a) Supporting point loads | *Z* to be determined from calculations using stress<br>~~$\frac{123{,}5}{k}\,N/mm2\left(\frac{12{,}6}{k}\,kgf/mm2\right)$~~ $\frac{123{,}5}{k}\,N/mm^2\left(\frac{12{,}6}{k}\,kgf/mm^2\right)$ |
| (2) Deep beams supporting deck girders in way of dry spaces:<br>(a) Supporting point loads | *Z* to be determined from calculations using stress<br>~~$\frac{123{,}5}{k}\,N/mm2\left(\frac{12{,}6}{k}\,kgf/mm2\right)$~~ $\frac{123{,}5}{k}\,N/mm^2\left(\frac{12{,}6}{k}\,kgf/mm^2\right)$ |

## ■ *Section 7*
## Bulkheads

### 7.3 Watertight and deep tank bulkheads

**Table 6.7.2 Symmetrical corrugations and double plate bulkheads (additional requirements)**

| Symbols | Type of bulkhead | Parameter | Watertight bulkheads | Deep tank bulkheads |
|---|---|---|---|---|
| $A_w$ = shear area, in ~~$cm_2$~~ $cm^2$, of webs of double plate bulkhead | Symmetrically corrugated, *see also* Notes 1 and 2 | *d* | – | To be not less than:<br>39 $l_e$ mm |

# Part 5, Chapter 1
# General Requirements for Offshore Units

## ■ *Section 2*
## Operating conditions

### 2.1 Inclination of unit

2.1.1 Main and essential auxiliary machinery is to operate satisfactorily under the conditions as shown in ~~*Pt 5, Ch 1, 2.1 Inclination of unit 2.1.1*, *Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3* or *Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3*~~ *Table 1.2.1 Inclination of ship units and other surface type units*, *Table 1.2.2 Inclination of column-stabilised units* or *Table 1.2.3 Inclination of self-elevating units*.

**Table 1.2.1 Inclination of ship ~~untis~~ units and other surface type units**

2.1.2 Any proposal to deviate from the angles given in ~~*Pt 5, Ch 1, 2.1 Inclination of unit 2.1.1*, *Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3* or *Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3*~~ *Table 1.2.1 Inclination of ship units and other surface type units*, *Table 1.2.2 Inclination of column-stabilised units* or *Table 1.2.3 Inclination of self-elevating units* will be specially considered taking into account the type, size and service conditions of the unit.

2.1.3 The dynamic angles of inclination in ~~*Pt 5, Ch 1, 2.1 Inclination of unit 2.1.1, Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3* or *Pt 5, Ch 1, 2.1 Inclination of unit 2.1.3~~ *Table 1.2.1 Inclination of ship units and other surface type units*, *Table 1.2.2 Inclination of column-stabilised units* or *Table 1.2.3 Inclination of self-elevating units* may be exceeded in certain circumstances, dependent upon type of unit and operation. The Builder is, therefore, to ensure that the machinery is capable of operating under these angles of inclination.

# Part 6, Chapter 1
# Control Engineering Systems

## ■ *Section 2*
## Essential features for control, alarm and safety systems

### 2.1 General

2.1.1 Where it is proposed to install control, alarm and safety systems to the equipment defined in *Pt 6, Ch 1, 1.2 Documentation required for design review 1.2.3*, the applicable features contained in ~~*Pt 6, Ch 1, 2.1 General*of~~ *Pt 6, Ch 1, 2.1 General* of the Rules for Ships are to be incorporated in the system design.

### 2.2 Control stations for machinery and equipment

2.2.1 The requirements for control stations for machinery and equipment are given ~~in*Pt 6, Ch 1, 2.2 Control stations for machinery*of~~ in *Pt 6, Ch 1, 2.2 Control stations for machinery* of the Rules for Ships, which are to be complied with where applicable. Additions or amendments to these requirements are given in the following paragraph(s) of this sub-Section.

# Part 7, Chapter 1
# Safety and Communication Systems

## ■ *Section 1*
## General requirements

### 1.1 General

1.1.1 This Chapter applies to all units defined in *Pt 1, Ch 2 Classification Regulations* on board which drilling, production and processing of hydrocarbons and/or storage of crude oil in bulk is undertaken. It is also applicable to Accommodation Units and Support Units as detailed in *Pt 3, Ch 4 Accommodation and Support Units*. However, Accommodation Units and Support Units not engaged in activities with drilling, production and processing of hydrocarbons and/or storage of crude oil in bulk units need not comply with all the requirements of *Pt 7, Ch 1, 2 Fire and gas alarm indication and control systems*, in relation to gas detection, or the requirements of *Pt 7, Ch 1, 5 Protection against gas ingress into safe areas*, *Pt 7, Ch 1, 6 Protection against gas escape in enclosed and semi-enclosed hazardous areas*, *Pt 7, Ch 1, 7 Emergency shutdown (ESD) systems* or ~~*Pt 7, Ch 1, 8 Emergency release systems (ERS)*of~~ *Pt 7, Ch 1, 8 Emergency release systems (ERS)* of this Chapter. This Chapter also states the fire detection requirements for units to be assigned the **UMS** and **CCS** notations, *see Pt 6, Ch 1, 4 Unattended machinery space(s) – UMS notation* and *Pt 6, Ch 1, 5 Machinery operated from a centralised control station – CCS notation*. Attention is to be given to the relevant Statutory Regulations of the National Administrations in the country of registration and area of operation, as applicable.

1.1.2 While ~~*Pt 7, Ch 2 Hazardous Areas and Ventilation*~~prescribes *Pt 7, Ch 2 Hazardous Areas and Ventilation* prescribes the boundaries of hazardous areas where special precautions are to be applied, the safeguards called for in this Chapter include provision for actions applicable where gas is present beyond hazardous area boundaries. Such circumstances may arise, for example, as the consequence of an uncontrolled well blow out or catastrophic failure of pipes or vessels.

## ■ *Section 6*
## Protection against gas escape in enclosed and semi-enclosed hazardous spaces

### 6.1 General

6.1.1 Enclosed and semi-enclosed hazardous areas as defined in *Pt 7, Ch 2, 1.2 Definitions and categories* are to be provided with alarms and safe guards required by ~~*Pt 7, Ch 1, 6.1 General 6.1.2*to~~ *Pt 7, Ch 1, 6.1 General 6.1.2* to *Pt 7, Ch 1, 6.1 General 6.1.4* to give protection against accidental release of hydrocarbon and toxic gases.

# Part 7, Chapter 3
# Fire Safety

## ■ *Section 3*
## Additional requirements for units with production and process plant

### 3.4 Water deluge systems, water monitors and foam systems

3.4.11 Fixed fire extinguishing systems on drilling areas on mobile offshore drilling units should be provided with:

(a) A fixed water spray system to provide protect to the drilling area (drill floor). The minimum water application rate is not less than 20.4 l/min·~~m2~~ $m^2$, or

(b) At least two dual-purpose (jet/spray) fire monitors are to be installed to cover drilling and well test areas. The minimum capacity of each monitor is not less than ~~100m3/h~~ $100m^3/h$. The monitors may be operated either remotely or locally. Monitors arranged for local operation should be sited on an accessible protected position.

# Part 9, Chapter 1
# General Requirements and Design Principles

## ■ *Section 1*
## General

### 1.3 Class notations

1.3.2 In addition to the normal class notations which may be assigned to an installation, for concrete units a suitable descriptive note will be included ~~in the *Offshore Register*~~ on the Class Direct website, e.g. **concrete hull**.

# Part 10, Chapter 1
# General Requirements

## ■ *Section 1*
## General

### 1.1 Application

1.1.7 The class notations and descriptive notes applicable to units classed in accordance with these Rules are to be in accordance with *List of abbreviations* ~~and*Pt 3, Ch 3, 1 General*~~ and *Pt 3, Ch 3, 1 General*, to which reference should be made.

1.1.12 The structural design of integral tanks for the storage of condensates is to comply with the requirements in this Part outlined for cargo tanks and other tanks designed for liquid filling. The density of the condensate is not to be taken as less than the minimum density values, as defined ~~in*Pt 10, Ch 2, 1.2 Definitions 1.2.3*~~ in *Pt 10, Ch 2, 1.2 Definitions 1.2.3* in *Pt 10, Ch 2 Loads and Load Combinations*, for strength and fatigue assessments.

1.1.13 The structural design of integral tanks for the bulk storage of liquid chemicals is to comply with the requirements in this Part outlined for cargo tanks and other tanks designed for liquid filling. The following requirements are also to be complied with:

(b) Consideration is to be given to the nature of the chemicals being stored, including their corrosiveness, reactivity and flammability. Arrangements are in general to comply with the *International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk* (~~*IBC Code - International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in BulkAmended by Resolution MEPC.225(64)*~~ *IBC Code - International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk Amended by Resolution MEPC.225(64)*), as interpreted by LR.

### 1.2 Definitions

1.2.3 **Moderate service**. A Moderate service is one where the site-specific responses of the vessel are less than or equal to the responses in unrestricted worldwide transit. The following responses are to be compared:
(a) Hull girder vertical wave bending moment.
(b) Relative wave elevation.
(c) Vertical acceleration.
(d) Roll angle.

1.2.4 **Harsh service**. A Harsh service is one which does not satisfy the definition of a Moderate service.

1.2.5 **Transit**. Any voyage of the unit, self-propelled or unpropelled, from one geographical location to another. The following are considered transit conditions:
(a) **Delivery voyage**. Delivery voyage of a unit along a defined route from a shipyard or field to the operating site at which the **OI** class notation is assigned. The delivery voyage is typically scheduled for restricted sea states.
(b) **Restricted service area transit**. Transit of a unit at any time across a restricted service area. Voyages of this nature may be carried out by disconnectable units that sail away within a defined service area either to avoid approaching heavy weather and/or to return to a dry dock for inspection.
(c) **Unrestricted worldwide transit**. Transit of a unit at any time across any sea area in the world. Voyages of this nature may be carried out by disconnectable units that sail away either to avoid approaching heavy weather and/or to return to a dry dock for inspection.

## ■ *Section 4*
## Structural arrangement

### 4.1 General

4.1.3 The Marine Environment Protection Committee of the International Maritime Organization (IMO) has decided that tankers which are used solely for storage and production of oil, and are moored at a fixed location except in extreme environmental or emergency conditions, are not required to comply with all the provisions of the *International Convention for the Prevention of Pollution from Ships, 1973*, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as ~~*MARPOL*~~ MARPOL) unless specified in whole or in part by the relevant National Authority. Therefore, double hulled construction would not be necessary unless specified by the National Authority. When ~~*MARPOL*~~ MARPOL is invoked for ship units, normally also the interpretations for ship units defined in MEPC Circ. 139(53) are applicable, but this is subject to adoption of MEPC Circ.139 by the National Authority.

## ■ *Section 10*
## Topside structure

### 10.1 General

10.1.1 The minimum scantlings of superstructures and deck-houses are to comply with the requirements of ~~*Pt 3, Ch 8 Process Plant Facility*~~ *Pt 3, Ch 8 Superstructures, Deckhouses and Bulwarks* of the Rules for Ships. Bulwarks and guard-rails are to comply with *Pt 4, Ch 6, 10 Bulwarks and other means for the protection of crew and other personnel* but special consideration is to be given to the scantlings of bulwarks at the fore end or screens protecting the swivel stack. In general, the scantlings of bulwarks at the fore end are not to be less than required for deck-house fronts at the position under consideration.

# Part 10, Chapter 2
# Loads and Loads Combinations

## ■ *Section 3*
## Dynamic load components

### 3.1 Symbols

3.1.1 For the purposes of this Section, the following symbols apply:
$\rho$ = density, tonnes/~~$m_3$~~ $m^3$, as defined in *Pt 10, Ch 2, 1.2 Definitions 1.2.3*

### 3.6 Accelerations

3.6.3 **Vertical acceleration.**

(a) The envelope vertical acceleration, $a_v$, at any position, is to be taken as:

~~$a_v = f_{prob} f_{Env\text{-}av} \sqrt{a^{\ 2}_{heave} + a^{\ 2}_{pitch-z} + a^{\ 2}_{roll-z}}$ m/s$^2$~~

$$a_v = f_{prob} f_{Env\text{-}av} \sqrt{a_{heave}^{\ 2} + a_{pitch-z}^{\ 2} + a_{roll-z}^{\ 2}} \text{ m/s}^2$$

3.6.4 **Transverse acceleration.**

(a) The envelope transverse acceleration, $a_t$, at any position, is to be taken as:

~~$a_t = f_{prob} f_{Env\text{-}at} \sqrt{a^{\ 2}_{sway} + \left(g \sin\theta + a_{roll-y}\right)^2}$ m/s$^2$~~

$$a_t = f_{prob} f_{Env\text{-}at} \sqrt{a_{sway}^{\ 2} + \left(g \sin\theta + a_{roll-y}\right)^2} \text{ m/s}^2$$

3.6.5 **Longitudinal acceleration.**

(a) The envelope longitudinal acceleration, $a_{lng}$, at any position, is to be taken as:

~~$a_{lng} = 0{,}7 f_{prob} f_{Env\text{-}alng} \sqrt{a^{\ 2}_{surge} + \left(\frac{L}{325}\left(g \sin 4 + a_{pitch-x}\right)\right)^2}$ m/s$^2$~~

$$a_{lng} = 0{,}7 f_{prob} f_{Env\text{-}alng} \sqrt{a_{surge}^{\ 2} + \left(\frac{L}{325}\left(g \sin\varphi + a_{pitch-x}\right)\right)^2} \text{ m/s}^2$$

# Part 10, Chapter 3
# Scantling Requirements

## ■ *Section 1*
## Scantling requirements

### 1.4 Hull girder shear strength

1.4.4 **Shear force correction due to loads from transverse bulkhead stringers.**

(a) In way of transverse bulkhead stringer connections, within areas as specified in *Pt 10, Ch 3, 1.4 Hull girder shear strength 1.4.4*, the equivalent net thickness of plate used for calculation of the hull girder shear strength, $t_{str\text{-}k}$ , where the index *k* refers to the identification number of the stringer, is not to be taken greater than:

where

$\tau_{str}$ = ~~$\frac{Q_{str-k}}{l_{str} t_{stc-net50}}$ N/mm$^2$~~ $\frac{Q_{str-k}}{l_{str} t_{sfc-net50}}$ N/mm$^2$

$Q_{str\text{-}k}$ = shear force on the longitudinal bulkhead from the stringer in loaded condition with tanks abreast full

= ~~$0{,}8F_{str\text{-}k}\left(1 - \frac{Z_{str} - h_{db}}{h_{bhd}}\right)$ kN~~ $0{,}8F_{str\text{-}k}\left(1 - \frac{Z_{str} - h_{db}}{h_{blk}}\right)$ kN

## ■ *Section 2*
## Cargo tank region

### 2.3 Hull envelope plating

2.3.3 **Bilge plating.**

(b) The net thickness of bilge plating, $t_{net}$ , without longitudinal stiffening is not to be less than:

~~$t_{net} = \frac{\sqrt[3]{r^2 S_t P_{ex}}}{100}$ mm~~ $t_{net} = \frac{\sqrt[3]{r^2 S_t P_{ex}}}{100}$ mm

### 2.4 Hull envelope framing

**Table 3.2.4 Section modulus requirements for stiffeners**

The minimum net section modulus, $Z_{net}$ , is to be taken as the greatest value calculated for all applicable design load sets, as given in *Pt 10, Ch 3, 2.6 Bulkheads 2.6.7*, and given by:

~~$Z_{net} = \frac{|P|sl_{bdg}^{\ 2}}{f_{bdg}C_s\sigma_{yd}}$ cm$^3$~~ $Z_{net} = \frac{|P|sl^2{}_{bdg}}{f_{bdg}C_s\sigma_{yd}}$ cm$^3$

## ■ *Section 6*
## Evaluation of structure for sloshing and impact loads

### 6.4 Bottom slamming

6.4.1 **Application.**

(b) For self-propelling units with conventional single screw, ship-type aft sections, additional strengthening against aft slamming will not normally be required. For units with full deep aft sections, strengthening to resist bottom slamming should be applied over 0,3*L* aft, using the requirements of *Pt 10, Ch 3, 6.4 Bottom slamming 6.4.3* and *Pt 10, Ch 3, 6.4 Bottom slamming 6.4.4* and the applicable draughts aft. Units with raised or unusual sections aft that may be susceptible to slamming will be specially considered, using the requirements of *Pt 4, Ch 2, 4.3 Strengthening for wave impact loads* and ~~*Pt 4, Ch 2, 5.2 Strengthening for wave impact loadsof*~~ *Pt 4, Ch 2, 5.2 Strengthening for wave impact loads* of the Rules for Ships.

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